13. Sources of Sulphur

316 Sources of sulphur have been noted in the provinces of Cammon, Saravane and Darlac.

As a supplement to this list, the reader is referred to Appendix XXI, in which several goldbearing deposits are noted which have been prospected, but for which concessions have not yet been granted and which are not being worked by any European enterprise. We shall now continue with a consideration of the conditions under which various other deposits, such as iron and salt, occur.

Iron. The various iron deposits which exist in Laos are alluvial deposits caused by the erosion of rocks under the action of rain water and water courses. They occur sometimes in hills from two to three hundred meters high, and sometimes in hillocks of a lesser height which do not exceed fifty or sixty meters.

The ore is found scattered throughout the mass of reddish clay alluvia, in flint nodules and isolated blocks of small dimensions. The richest ores are formed of irregular masses of a reddish cellular rock somewhat similar to millstone rock, but softer.

The ore is extracted in furnaces provided with alternating blowers. These are first loaded with a layer of crushed and washed ore, then a layer of charcoal, and the layers are thus repeated several times. When the process has been completed a bloom of spongy iron is left at the bottom of the furnace, and this iron is reheated and puddled. When the molten mass is sufficiently homogeneous, blacksmiths take it and transform it into farming implements--axes, machetes, etc.--all of which are sold locally.

[439] Production from the iron deposits in Laos is not sufficient for the needs of local consumption, since [319] [Illustration] [320] [Blank page] [321] iron is imported from Europe in small bars and sold for from 1 franc 30 centimes to 1 franc 50 centimes per kilogram.

It is unlikely that the country's iron deposits, at least those which have so far been discovered, will ever justify exploitation by European methods, because of their insufficient size.

• 317 Salt. The same is true in the case of salt, and the country's production is insufficient for local consumption.

The salt mines or, to use the proper term, saltbearing deposits are of three different kinds:

1. Layers of rock salt located in the center of mountain masses and through which infiltration water seeps. When this water reaches the bottoms of the valleys, it is held there by the first layer of impermeable terrain which it encounters. It is brought to the surface through wells, and the salt which it contains is extracted by evaporation. This procedure can be carried out during only a few months of the year, after the greater part of the rain water has run off. 317.

2. Here we have the same type of salt formation as the above, but seepage of saline water takes place along a hillside or over rocks exposed to the open air. The saturated water impregnates the soil and becomes partly crystallized there or forms saline efflorescences on the surface. In the first case, the soil is washed and the wash water evaporated. In the second, the saline efflorescences are collected and mixed with the salt which has been extracted from the soil by washing.

3. Lastly, other deposits seem to be constituted by old sandy bottoms of saline lakes. During the rainy season ground water becomes saturated through contact with the layer of saltbearing sand and is extracted through wells and then evaporated.

b) Mining Companies

Instead of going to nourish foreign enterprises which are often hazardous, French capital should, as we have already noted, encourage the exploitation of the mineral deposits in Laos. 316

We ought to set to work resolutely and begin by [322] working the gold mines. We might hope thereby to obtain a large immediate profit, even in the country's present state of development, and with no need for better means of communication.

Plans and even studies are being made, moreover, towards the economic equipment of Laos as regards more rapid transport facilities, both in the interior and between the Mekong and the coast.

Other mineral deposits will very probably be discovered along with the gold mines, as has been the case in Attopeu, and they may begin to be worked when the network of roads and means of communication has been completed, or even partly so. Other enterprises, such as the exploitation of forest resources, livestock breeding, farming, etc. will follow as the country becomes better known.

At the present time two French mining companies have been formed in Laos, one to work the gold and copper in the region of

396 is also cut out with a hatchet so as to decrease the thickness of the walls and render them more elastic.

When the pirogue is as wide as is desired, or else as wide as the wood being used will allow without any danger of splitting or bursting, strong rectangular crossbraces are set at regular intervals and tailed into the sides of the pirogues a few centimeters below the gunwales. When it has reached this state the pirogue is virtually finished. It has its final shape, and looks like the elongated half of a fish which has been split lengthwise.

All that remains is to finish the work by giving the bottom and sides the requisite thickness, by polishing the wood, smoothing the curves, etc.

Finally comes the moment of launching. It must be said, to the honor of the builders' sure eye and skill, that it is always successful and that once put into water the pirogue behaves well in its element, with a light and graceful balance.

396 439 435 The price of pirogues varies depending on their dimensions and [466] the region, and can therefore not be fixed in any absolute fashion. A new pirogue, in fact, costs from 50 to 300 francs. In Cambodia a pirogue from Laos costs twice what it cost in its land of origin. Thus it may readily be imagined that pirogues are exported from Lower Laos in fairly large numbers. The statistics for 1899 show exports of 552 pirogues of various dimensions, with a [Illustration here] total value of 55,195 francs, or an average purchase price of 100 francs apiece.

398 Cartwrights. The construction of carts, wagons, pack-saddles for oxen and elephant palanquins is a specialized industry only on the right bank and in Siam. In French Laos carts are little used because of the nature of the terrain, and there are no cartwrights. Pack-saddles for oxen and elephant palanquins are made by nearly everyone, particularly by drovers and carnacs.

•317 276 Lime. Lime is made in Laos, primarily for inclusion in betel masticatories.

[467] The kilns are dug in the clay on banks of watercourses, near calcareous masses from which limestone is taken.

272 Alcohol. The distillation of grain--rice, maize and hemp-seed--is not an industry in the strict sense, for every village and every family makes alcohol on occasion.

272 The distillation methods used are good ones, but the equipment used leaves much to be desired and does not make it possible to obtain rectified alcohol of a high degree. By taking 25 or 28 proof native alcohol and distilling it for a second time with European equipment, a fairly good-tasting alcohol can be obtained which is 68 to 72 proof.

389 Powder-making. The inhabitants of Laos make the powder themselves which they use for hunting and for fireworks. They know how to proportion and triturate the ingredients--charcoal, saltpeter (1)

[317] (1) The saltpeter which is collected in grottoes containing calcareous rocks is chiefly made up of masses of droppings from birds and bats. The bat is called "Kiea" and saltpeter "Khi-Kiea," or, literally, Droppings of bats.

and sulphur--in order to make either explosive powder or fusing powder.

192 The bonzes are the fireworks-makers par excellence who make
527 the many and varied fireworks without which no celebration is really
389 complete. Bombs, firecrackers, Roman candles, serpents, pinwheels, etc. and, in a word, almost all the usual fireworks are made using rudimentary processes and local products.

389 The rockets (Bang-Fai) deserve special mention. They consist of a body containing fusing powder, to which is attached a wick several meters long and made of spun cotton or sometimes even of paper. The latter is smeared with mealed gunpowder mixed with gum, and the whole is fastened to a directing shaft. If the rocket is an Aeolian one, its rear is provided with a kind of Pan's pipe made of bamboo tubes which gives forth a harmonious sound as it describes its trajectory in the air.

The rockets vary greatly in size. In some the powder weighs only a few decagrams, and [468] the guide shaft is from two to three meters long. Other larger ones carry a "Mune" of powder (about 12 kilograms) and sometimes more, and the guide shaft is a whole stalk of bamboo some 15 meters long and from 12 to 15 centimeters in base diameter.

Rockets are generally decorated with gilded or colored paper. With the application of rice paste motifs, some of them manage to look very like a dragon with threatening jaws and terrifying eyes, and in these the body envelops the shaft and the head contains the Aeolian harp as well as the powder cylinder. The stands used for launching